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AMERICAN

TECHNICAL REPORT NO. 398-45

GERMAN "SEISMIK" MINE UNIT

SEPTEMBER 1945

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TECHNICAL REPORT NO. 398-45

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GERMAN "SEISMIK" MINE UNIT

SUMMARY

This report contains information on the German "Seismik" influence mine unit, a unit which is intended to fire on very low frequencies. This unit was in the development stage, and had not been used operationally.

SEPTEMBER 1945

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GERMAN "SEISMIK" MINE UNIT

1. Introduction.

(a) The "Seismik" is an experimental attempt to produce a mine firing unit which operates on very low frequencies. It was in the developmental stage, and was intended to be used in combination with firing units operating on other principles.

(b) Samples of the Seismik have been shipped to the U.S. Navy Ordnance Investigation Laboratory. The remainder of the information has been obtained through interrogation of German Naval personnel.

2. General.

The "Seismik" (Seismograph Microphone) is used in a system which the Germans call the "S-Systeme". The system consists of a special microphone and a simple electrical circuit designed to be used as a low frequency component for a combination mine unit. It is known that it was intended to combine the Seismik with M4, A 4, and D 2. The last was to have been designated DS 1, but never went beyond the idea stage. The Seismik microphone is designed for frequencies of the 1-10 cps range, but had been applied in development only to a circuit whose optimum frequency was 508 cps.

3. The Microphone.

The Seismik microphone is a normal D 1 pressure unit component, modified by the removal of the suction contact, which is, in this case replaced by a carbon-button microphone driven by the thin internal aluminum diaphragm normally found in D 1 units. (See Figs. 3 and 4.) Thus, due to the equalizing channel in the unit, the carbon-button is not loaded by hydrostatic pressure, and retains its original operating point and sensitivity.

4. The Circuit.

The circuit of the Seismik is shown in Fig. 1. The microphone is fed by a battery in a transformer circuit. Introduction of the transformer automatically eliminates the very low frequencies. The secondary of the transformer is connected, unrectified, to the oper-

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The Circuit (Cont'd.)

ating coil of relay F, which must oscillate with the alternating current output, thus eliminating the high frequencies, depending upon the degree of damping of the relay. Oscillation of relay contact (f) alternately charges condenser C_1 from battery B_2 , and discharges it through the operating coil of relay R on the other half-cycle. Closures of contact (r) cause charging of C_2 through w_1 , and the charge on condenser C_2 occurs in a manner similar to that shown in Fig. 2, with w_2 causing the small discharges. When C_2 is charged sufficiently to operate relay Fu, contact (fu) closes and B_2 fires the detonator, or permits another influence firing component to do so.

5. Frequency Response.

The optimum frequency response of the system described is reported to be 5-8 cps. The microphone itself, however, is reported to have an essentially flat response down to one cycle/sec. The lower frequencies are eliminated partially by the microphone transformer, and partially by the values of w_2 and C_2 . The higher frequencies are eliminated by the unrectified signal current on the relay coil. This microphone might be used for other purposes where a pressure-equalized diaphragm type is necessary, but SVK (German Experimental Mining Establishment) considered that, due to its mounting, the response would start to fall off at about 15-20 cps, with possibly a peak at 30 cps due to the fact that the rubber bag resonates at that frequency.

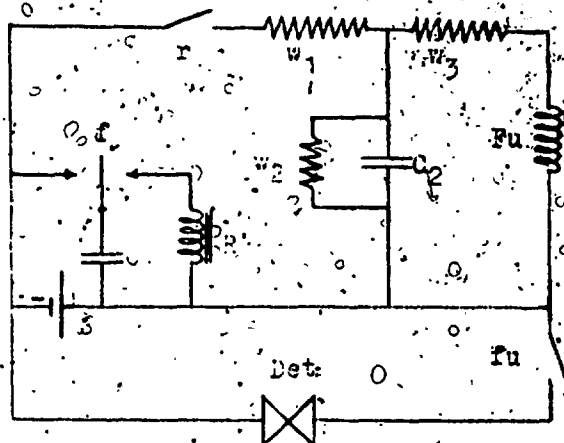
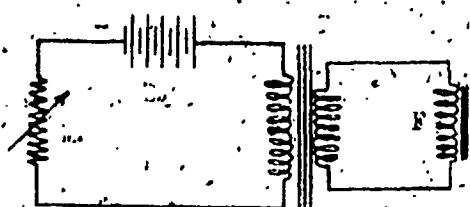
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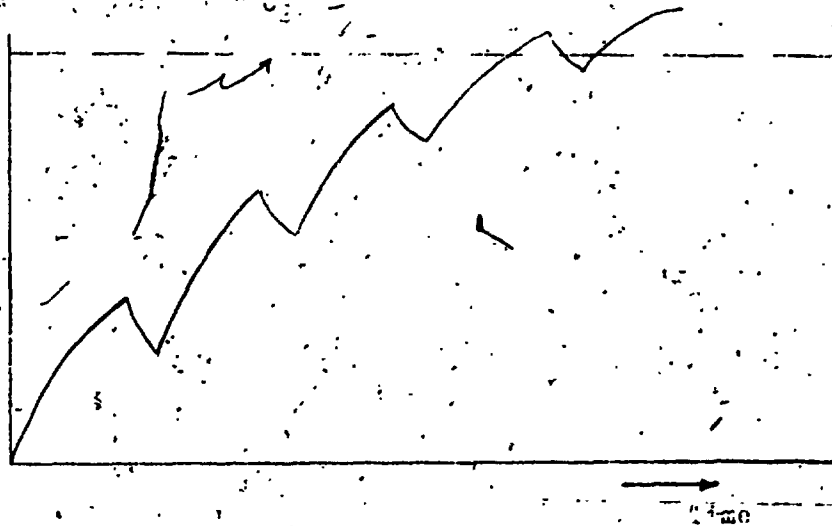
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Microphonic Transformer



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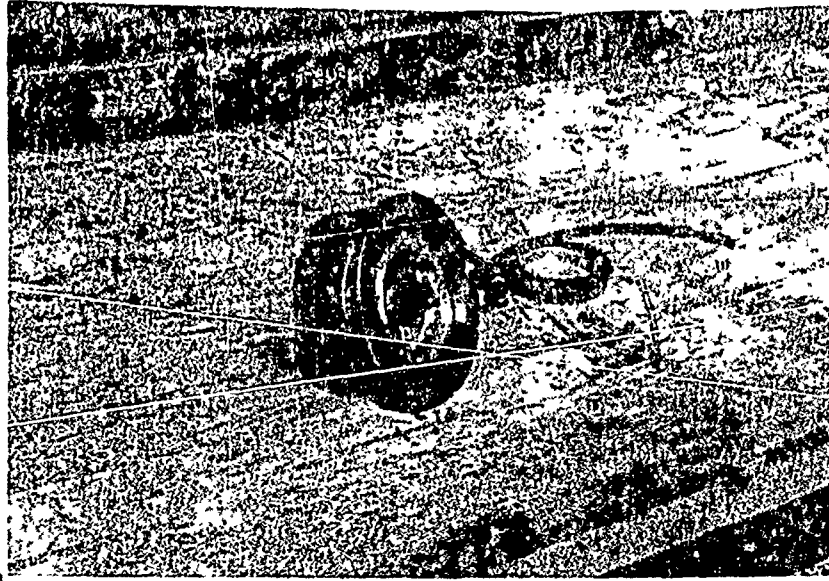
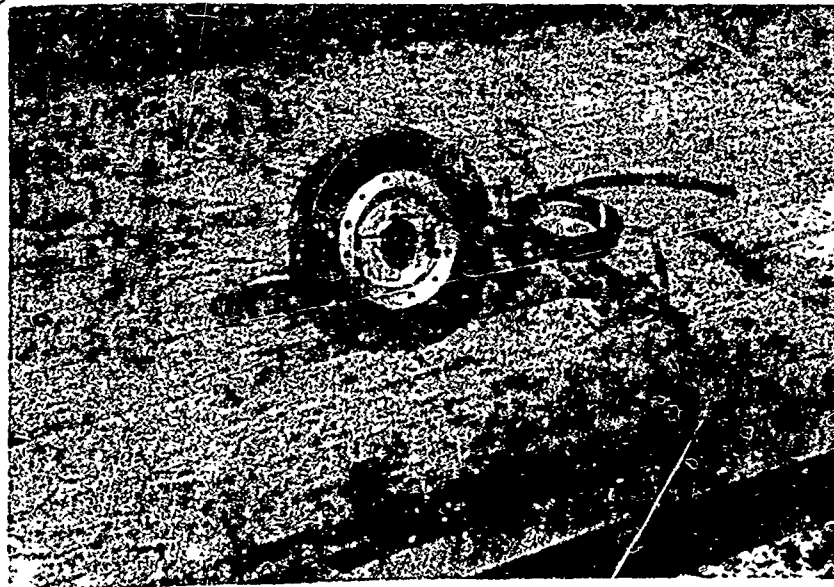


Fig.4



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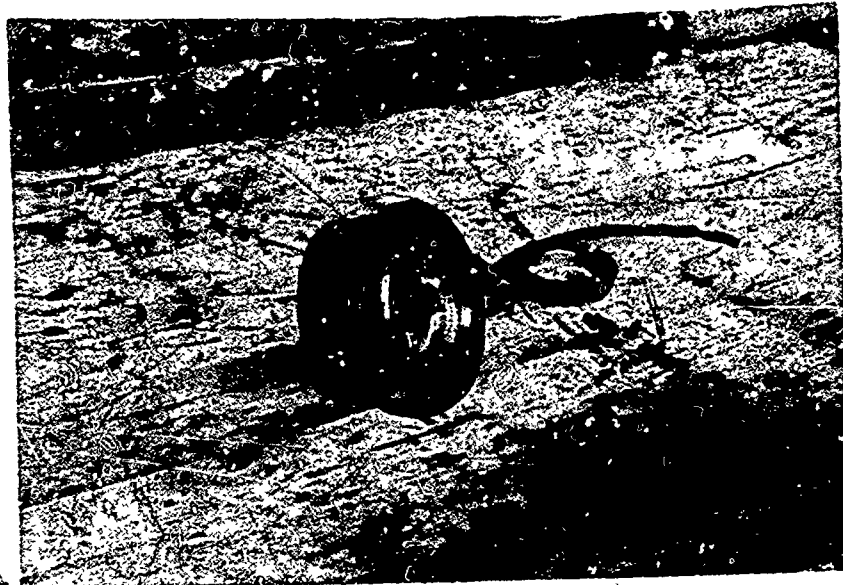


Fig.4

